# PATENT ABSTRACTS OF JAPAN

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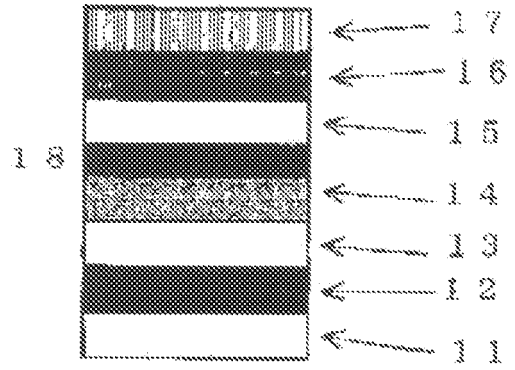
## (54) OPTICAL RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To prevent rapture of a recording mark and to suppress temperature rising of a phase transition recording layer even when the layer is repeatedly irradiated with a laser beam in a phase transition optical disk utilizing super resolution technology.
SOLUTION: An optical recording medium having a mask layer 12 whose light transmittance is reversibly changed by change of temperature owing to irradiation with light and which is formed on a light transmissible substrate 11, a first dielectric film 13, a phase transition recording film 14 showing a crystalline-amorphous phase change, a second dielectric film 15, a reflection film 16 and a protective film 17 laminated on the mask layer 12 in this order has a transparent metallic thin film 18 inserted between the phase transition recording film 14 and the second dielectric film 15.



## CLAIMS

[Claim(s)]
[Claim 1]On a light transmittance state board, a mask layer from which light transmittance changes with the temperature changes by exposure of light reversibly is formed, An optical recording medium inserting a transparent metal membrane between said record film and said 2nd dielectric film in an optical recording medium which it comes to laminate in order of record film which causes the 1st dielectric film and crystal-amorphous change on it, the 2nd dielectric film, a reflection film, and a protective film.
[Claim 2]The optical recording medium according to claim 1, wherein said metal membrane is aluminum or Cu.

[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to an especially rewritable phase change type optical recording medium about the optical recording medium which performs record of information, and reproduction by the exposure of a laser beam.
[0002]
[Description of the Prior Art]As an erasable optical recording medium, the phase-change optical disk is widely known from the former. A phase-change optical disk absorbs and generates heat, and carries out the phase change of the laser beams with which the material of the recording layer was condensed between a crystal-like object and an amorphous state. It has detected as a digital signal by irradiating this with laser beams for the reflectance change by this phase change, and detecting that catoptric light. As a phase change disk is shown in drawing 2, each class is formed on the transparent substrate 11 in order of the mask layer 12, the 1st dielectric film 13, the phase change record film 14, the 2nd dielectric film 15, the reflection film 16, and the protective film 17.
[0003]By the way, in the medium, high recording density-ization is demanded with large-scale-izing of an optical recording medium. In order to attain high recording density-ization, it is necessary to make a record pit small and high-density. In connection with it, the spot diameter of reading lighting must also be made small. However, light spot diameter D is expressed with D=lambda/NA by the wavelength lambda of light, and the throat area ratio NA of the lens to be used. Here, although light spot diameter D is made small, in order to have to enlarge the throat area ratio NA of a lens enough or to have to make wavelength lambda of light small, there is a limit. For this reason, the art which reads the signal from a record pit smaller than light spot diameter D, i.e., the art of super resolution, is needed for high density recording reproduction.
[0004]The mask layer from which optical properties, such as light transmittance, change with light intensity or temperature is provided before the recording part of a medium (optical exposure side) one of the art of super resolution, The method of carrying out the opening only of the one portion of light spot, hitting against a recording part, and detecting a signal is proposed, for example by JP,5-

12715,A, Nihon Keizai Shimbun (1998.6.20), SPIE (1998), etc.
[0005]Examination which it is going to apply to the phase-change optical disk which mentioned the art of such super resolution above is performed.
[0006]
[Problem(s) to be Solved by the Invention]Under the present circumstances, in order to acquire the super resolution effect, it is necessary to glare through the laser beams of to some extent high power. For example, if it does not irradiate with the laser beams of the power more than double [ of the former (when there is no mask layer) ] when thermochromic material is used for a mask layer, the opening of the mask layer is not carried out. Therefore, when the same track is repeatedly irradiated with high-output laser beams to an optical disc by operation of still playback etc., the temperature of record film rises and it is an unnecessary crystal. - Amorphous transition took place and the problem that a recording mark will be destroyed had arisen.
[0007]
[Means for Solving the Problem]In order to solve a technical problem mentioned above, [0008]
[Embodiment of the Invention]Hereafter, this invention is explained with reference to drawing 1. Each class is formed on the transparent substrate 11 in order of the mask layer 12, the 1st dielectric film 13, the phase change record film 14, the iransparent metal thin film 18, the 2nd dielectric film 15, the reflection film 16, and the protective film 17.
[0009]Thus, thermal conductivity had composition which inserts the iransparent metal thin films (for example, aluminum, Cu, etc.) 18 for which it has translucency highly between the phase change record film 14 and the 2nd dielectric film 15. Even if the radiation efficiency of the phase change record film 14 improves and it irradiates with high-output laser beams by having such composition, the rise in heat of the phase change record film 14 is controlled, and destruction of a recording mark becomes difficult to take place.
[0010]However, since reflection there will become large and the optical characteristic of an entire disk will change if the thickness of the inserted transparent metal thin film 18 is thick therefore, the thickness of the iransparent metal thin film 18 makes the minimum influence which it has on an optical property, and it needs to set it up to such an extent that a radiation effect required for coincidence is acquired.
[0011]For example, thermochromic coloring matter is formed by 350-nm vacuum evaporation as the mask layer 12 on the transparent substrate 11 which consists of polycarbonate. ZnS-$SiO_2$ as the 1st dielectric film 13 within the same sputter device Then, 210 nm, as the phase change record film 14 -- AgInSbTe -- as 22 nm and the transparent metal thin film 18, ZnS-$SiO_2$ is formed as 5 nm and the 2nd dielectric film 15, and 140 nm of aluminum is formed for aluminum as 10 nm and the reflection film 16. Then, ultraviolet curing resin is applied as the protective film 17.
[0012]A still durability improvement is achieved in the optical disc considered as such composition, without spoiling the conventional optical property.
[0013]

[Effect of the Invention]As explained in full detail above, according to the optical recording medium concerning this invention, the rise in heat of the phase change recording layer by the still characteristic in the phase-change optical disk using the super resolution effect can be controlled, and destruction of the recording mark of a phase-change optical disk can be prevented.

[Translation done.]

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a sectional view showing one example of the optical recording medium concerning this invention.
[Drawing 2]It is a sectional view showing the conventional optical recording medium.
[Description of Notations]
11 Substrate
12 Mask layer
13 The 1st dielectric film
14 Phase change record film
15 The 2nd dielectric film
16 Reflection film
17 Protective film
18 A transparent metal thin film

[Translation done.]